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China Report

SCIENCE AND TECHNOLOGY

No. 60

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CONTENTS

NATIONAL DEVELOPMENTS

Briefs
Computer Operation Meeting in Hohhot 1
Hunan Science, Technology Association 1

LIFE SCIENCES

Medical Experiments in Lung Transplants Show Improvement (BEIJING RIBAO, 8 Aug 80) ... 2

Magnetotherapeutic Eye Glasses Require Further Research (Zheng Jiang; GUANGMING RIBAO, 18 Aug 80) ... 4

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

Qinghai Scientific Technical Association Holds Third Congress (Qinghai Provincial Service, 1 Sep 80) ... 6

Briefs
Heilongjiang Scientific and Technological Association 7
Anhui Scientific Files Conference 7
Beijing Scientific Personnel 7

PUBLICATIONS

Table of Contents of 'SHUILI XUEBAO' No 3, 1980 (SHUILI XUEBAO, 17 Jun 80) ... 8

Table of Contents of 'WULI' No 3, 1980 (WULI, Jun 80) ... 10

ABSTRACTS

ARCHITECTURAL ENGINEERING

TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY], No 1, Mar 80 12

GEOLOGY

DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA], No 3, Jul 80 20

HYDRAULIC ENGINEERING

SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING], No 3, 17 Jun 80 31

METALLURGY

GANGTIE [IRON AND STEEL], No 3, May 80 36

PROSPECTING ENGINEERING

TANKUANG GONGCHENG [PROSPECTING ENGINEERING], No 1, 3, 4, Feb, Jun, Aug 80).. 41

BRIEFS

COMPUTER OPERATION MEETING IN HOHHOT--In order to make full use of all computers in China, the China Computer Society and the China Electronics Society recently held a national experience exchange meeting on the operation and maintenance of computers in Hohhot municipality. Attending the meeting were some 200 cadres from 160 units throughout the country. Some noted professors and experts also attended this meeting. Ting Mao, chairman of the standing committee of the Regional People's Congress, Chen Binyu, vice chairman of the Regional People's Government, and Wang Zaitian, vice chairman of the Regional CPPCC Committee, attended and received all representatives at the meeting. [Hohhot Nei Monggol Regional Service in Mandarin 1100 GMT 22 Sep 80]

HUNAN SCIENCE, TECHNOLOGY ASSOCIATION--The third congress of the Hunan Provincial Science and Technology Association was held for 6 days and ended in Changsha on 23 September. The congress elected the third committee of the Provincial Science and Technology Association. Professor (Sun Benwang), vice president of the National Defense Science and Technology University, spoke during the congress. Leading comrades of the Provincial CCP Committee and Provincial Government attended the closing ceremony and Liu Fusheng spoke. [Changsha Hunan Provincial Service in Mandarin 1100 GMT 23 Sep 80]

CSO: 4008

LIFE SCIENCES

MEDICAL EXPERIMENTS IN LUNG TRANSPLANTS SHOW IMPROVEMENT

Beijing BEIJING RIBAO in Chinese 8 Aug 80 p 1

[Article: "A Dog With a Heterologous Lung Survived 390 Days"]

[Text] Reporters Chen Xuhao [7115 4872 6275] and Wu Yafang [0702 0068 5364] report that in the laboratory of the department of chest surgery of Beijing Municipal Institute of Tuberculosis there is a dog named Heihua [Black Spot] who has a left lung that has been transplanted from another dog. Up to yesterday, the dog had survived 122 days [since the operation]. Previously, a black dog had survived 390 days but died on 31 May of idiopathic pneumothorax of the right side; that was the highest domestic record. The surgeon who performed the lung graft operation on the 2 dogs is the chest surgery specialist Xin Yuling [6580 5148 7881], Deputy Chief of the institute. This is a new achievement of the work of Xin Yuling and his colleagues in search for successful human lung transplant.

The purpose of performing lung transplant on dogs is to benefit mankind, to break the barrier in lung transplant in the human body which would save victims of lung cancer and other serious pulmonary diseases. In recent years many physicians here and abroad have struggled to accomplish this. Early in 1958, Doctor Xin began the work of lung graft on dogs, but due to many reasons, especially to the 10 years of riot of the "gang of four," the experimental activity was forced to discontinue for a whole of 20 years. After the gang of four was smashed, Doctor Xin and colleagues began this research project once again. Doctor Xin exerted a great deal of effort in the lung graft work, and encouraging results were also obtained.

The group of dogs on which lung transplant was performed survived only several days on the average, in 1958. In 1978, the survival period of the group of dogs averaged a few more than 10 days. Following the improvement on the method of anastomosis of pulmonary vessels and the postoperative treatment procedure, the 1979 group survived an extended period of more than 50 days, on the average. At present, the lung transplant experiments of Doctor Xin have caught up with the international level.

On the basis of the relatively better results, on 13 Jan 79, Doctor Xin performed China's first human lung transplant. On 17 Oct of the same year, a second case was performed. In these 2 cases, the operation was successful, but due to lack of effective anti-rejection measures, serious rejection reactions occurred on the 7th and 12th days respectively and the transplanted lungs had to be removed to save the life of the 2 patients. At present, Doctor Xin Yuling is moving forward in the world-wide difficult subject of human lung transplant with renewed confidence.

6248
CSO: 4008

LIFE SCIENCES

MAGNETOTHERAPEUTIC EYE GLASSES REQUIRE FURTHER RESEARCH

Beijing GUANGMING RIBAO in Chinese 18 Aug 80 p 1

[Article by Zheng Jiang [6774 3068]: "Magnetotherapeutic Eyeglasses Are Not Suitable for Large Scale Extension at Present"]

[Text] Since the end of last year, after some newspapers (including GUANGMING RIBAO) published the news of successful research on magnetotherapeutic eyeglasses in Beijing, there are now some 20 factories operated by schools in Beijing that are manufacturing magnetotherapeutic eyeglasses. Advertisements for these eyeglasses may be seen everywhere on the streets and alleys. The sale has reached as many as several hundred thousand pairs.

According to the related department, for the purpose of applying magnetotherapy, the eye department of Hunan College of Medicine Hospital carried out an experiment in 1976 on the effect of a magnetic field on the eyes of rabbits. Results indicate that under the action of a relatively strong magnetic field for a long time, turbidity of the crystalline lens of the rabbit eye appeared, mostly in the front portion of the lens, in the shape of small dots in morphology in most cases. Within the limit of field strength in the laboratory, turbidity of the vitreous body was not observed. In the weak magnetic field group--below 700 gauss, there was not a single case of changes in the crystalline lens of eyes of rabbits. It was, therefore, believed that weak magnetic field for a short period of time may be applied clinically, but strong magnetic field for a prolonged period of time can damage the human eye.

The related department believes that these magnetotherapeutic eyeglasses remain, at present, in the experimental and observational period. The period of experimentation is still short, and the accumulated technical data not sufficient for technical certification. Although, in the outpatient magnetotherapeutic experiment of more than one year, no side effects have been observed to date, but whether there is side effect in long term application remains to be studied and investigated further.

For the general masses, especially the young and healthy persons, magnetotherapeutic eyeglasses are not suitable for large scale distribution at present.

The related department points out that as a medical therapeutical device, magnetotherapeutic eyeglasses have not yet been certified. They must not be manufactured at random or used carelessly because if the wearer is harmed, there would be no way to pin down the responsibility.

The wearer or some units may make the eyeglasses themselves and the materials and parameters they use may not always be suitable. Even the magnetotherapeutic eyeglasses designed by some hospitals might not always be scientific. Some parameters are still being tried, studied, and improved. If magnetotherapeutic eyeglasses are improperly used bad results may be created. The phenomenon of crystalline lens turbidity observed in the rabbit eye experiments may even occur. As a matter of fact, due to lack of scientific knowledge, some people one-sidedly believe that the stronger the magnetic field is--the longer the duration of action is, and, therefore, the more effective the eyeglasses will be. They make for themselves electromagnetic eyeglasses of several thousand gauss, or, unlimitedly increase the action time and individual cases of serious result of induced cataract have occurred. They are complaining about the anarchy situation in the production of magnetotherapeutic eyeglasses, and some irregular and careless method of manufacturing the glasses just to make a profit. These glasses are sold in large batches on the marketplace irresponsibly. This is extremely improper and must be stopped at once. The sick must never "look for a cure so urgent that he forgets to think". Treatment must be carried out under the concrete guidance of a physician's strict and solemn clinical observation. A related physician of the eye department pointed out that as far as the treatment effect of magnetotherapeutic eyeglasses is concerned, it is demonstrated mainly in the capability of the eyeglasses to improve the eyesight of some wearers while the extent of improvement varies with the degree of nearsightedness and the age. However, the eyeglasses cannot change the degree of light inflection and the cure also cannot be stable without persistent application to stabilize the effect. There are many ways of treating nearsightedness and magnetotherapeutic eyeglasses are only one of these. It is not true, as some advertisements and newspapers say, that these eyeglasses are effective for true or pseudo nearsightedness. A scientific and factual perspective is, therefore, necessary in the matter of magnetotherapeutic eyeglasses.

6248
CSO: 4008

QINGHAI SCIENTIFIC TECHNICAL ASSOCIATION HOLDS THIRD CONGRESS

SK020633 Xining Qinghai Provincial Service in Mandarin 1100 GMT 1 Sep 80

[Excerpts] The Third Congress of the Qinghai Provincial Association of Science and Technology was ceremoniously held on the morning of 1 September at the auditorium of the provincial guest house. Attending the opening ceremony were leading comrades of the provincial party committee, the Standing Committee of the provincial people's congress, the provincial people's government, the provincial CPPCC committee and the provincial military district including Zhang Guosheng, (Huang Busi), Song Lin, Liu Chengyun, Ma Wanli, (Shang Baian), (Ma Letian), (Sun Yaoliao) and (Zhu Yan). Representatives of the provincial trade union council, the provincial women's federation, the provincial CYL committee and the provincial federation of literary and art circles attended the congress and extended their congratulations.

Liu Chengyun, vice chairman of the Standing Committee of the provincial people's congress and active chairman of the provincial association of science and technology, presided over the opening ceremony. (Kong Xiang), vice chairman of the provincial association of science and technology, delivered an opening speech.

(Sun Zhaohuan), secretary of the secretariat of the China Scientific and Technical Association, made a special trip to extend greetings to the congress and delivered a speech. Song Lin, Standing Committee member of the provincial party committee and deputy governor of Qinghai Province, also spoke at the opening ceremony. In his speech, he emphasized the importance of science and technology. He urged leaders at all levels to pay attention to science and technology, improve the party's leadership over the work, further implement the party's policies on intellectuals and bring the role of scientists and technicians into full play in achieving the four modernizations.

CSO: 4008

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

BRIEFS

HEILONGJIANG SCIENTIFIC AND TECHNOLOGICAL ASSOCIATION--Eighteen delegations from various prefectures and municipalities and specialized associations in Heilongjiang Province, a total of 1,000 people, arrived in Harbin on 15 August to attend the Second Provincial Congress of Scientific and Technological Associations. Wang Jinling, deputy governor of Heilongjiang Province and deputy council director of the provincial agricultural society, and responsible comrades of the provincial scientific and technological association, received the delegations at the station. [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 15 Aug 80 SK]

ANHUI SCIENTIFIC FILES CONFERENCE--The First Anhui Provincial Work Conference on Scientific and Technical Files, which was jointly sponsored by provincial economic capital construction, scientific and technical, and agricultural commission sand archives bureau was held in Hefei from 28 August to 1 September. Responsible persons of provincial, prefectural, municipal and county departments and offices concerned and representatives of institutes of higher learning and major plants, mines and enterprises, totaling 405 people attended the conference. (Yuan Zhen), Standing Committee member of the provincial CCP committee, spoke at the con conference. (Huang Xiucheng) and (Wang Shugang), deputy directors of the provincial archives bureau, conveyed the guidelines of the national work conference of archives at or above provincial levels respectively. They also put forth measures for improving the work in Anhui. The conference participants stressed the importance of the work on scientific and technical files for the building of the four modernizations and called for strengthening leadership over the work. [Hefei Anhui Provincial Service in Mandarin 1100 GMT 10 Sep 80 OW]

BEIJING SCIENTIFIC PERSONNEL--Beijing, 15 Sep (XINHUA)--According to a survey by the Chinese Academy of Sciences, 88 percent of the scientific personnel in the Beijing area who have won rewards for major scientific and technological achievements during the 1978-1979 period fall in the 36-50 age bracket. The average monthly income for these personnel ranges from 56 yuan to 70 yuan. To give greater play to their role, special attention must be paid to improving their working and living conditions, the report stressed. [Beijing XINHUA Domestic Service in Chinese 1255 GMT 15 Sep 80 OW]

CSO: 4008

TABLE OF CONTENTS OF 'SHUILI XUEBAO' NO 3, 1980

Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 3, 17 Jun 80 on back cover

[Text] Statistical Testing Research on the Methods of Parameter Estimation in Hydrological Computation...... Cong Shuzheng [0654 2885 6927] and Zhang Weiran [1728 4850 3544], both of the East China College of Hydraulic Engineering; Tan Weiyan [6223 4850 3508] and Xu Yingbo [1776 2503 3134], both of the Nanjing Institute of Hydrology, Ministry of Water Conservancy; Huang Shouxin [7806 1343 0207], Water Conservancy and Hydroelectric Power Research Institute; Chen Yuanze [7115 3293 3419], Fourth Engineering Bureau, Ministry of Electric Power (15)

Effects of Closing Off an Estuary on the Tides in an Adjoining Bay......Lin Bingnan [2651 4426 0589], Water Conservancy and Hydroelectric Power Research Institute, Qinghua University; Zhao Xuehua [6392 7185 5478] and Shi Linbao [2457 7792 1405], both of the Institute of Estuarine and Coastal Engineering Research, Zhejiang Province (26)

Mathematical Model of Unsteady Seepage Flow in Embankment Dams......Tao Tongkang [7118 0681 1660], Nanjing Hydraulic Engineering Research Institute (36)

Determination of the Deformation Characteristics of Rock Masses by Radial Jacking Tests......Ye Jinhan [5509 6855 3352] and Wu Mingjiang [0702 6900 3068], both of the Water Conservancy and Hydroelectric Power Research Institute; Ji Liangjie [1323 5328 2638] and Yang Ziwen [2799 1311 2429], both of the Research Division, Chengdu Institute of Design and Exploration (51)

Static Calculation of Water Load Acting on Tunnels...... Zhang Youtian [1728 2589 1131] and Zhang Wugong [1728 2976 0501], both of the Water Conservancy and Hydroelectric Power Research Institute (62)

Short Articles

Use of the Orthogonal Regression for Determining the Drip Irrigation Index for Tomato......Ding Xi [0002 3356] and Lu Su [7120 1687], both of the Beijing Municipal Hydraulic Engineering Research Institute (61)

The Effects of Suspended Sediment on the Mechanism of Turbulent Flow......Zhu Pengcheng [2612 7720 4453], Water Conservancy and Hydroelectric Power Research Institute (66)

Stress Calculation Based on Measurement in Concrete Dam...... Guan Zhicheng [4619 1807 2052], Zhejiang University (72)

Discussion

9717
CSO: 4008

TABLE OF CONTENTS OF 'WULI' NO 3, 1980

Beijing WULI [PHYSICS] in Chinese Vol 9 No 3, Jun 80 on back cover

[Excerpt] Research Reports

Measurement of Temperature, Pressure and Other Parameters in a High Pressure Cell......Fu Huifang [0265 1979 5364] and Zhu Chengming [2612 2052 2494], both of Guiyang Institute of Geochemistry, Chinese Academy of Sciences (193)

X-Ray Topographic Studies of the Defects in Gadolinium Gallium Garnet Single Crystals......Bai Naizhi [4101 6621 2535], Cui Shufan [1508 2885 5400], Ge Peiwen [5514 1014 2429], Liu Hairun [0491 3189 3387] and Zhang Lehui [1728 2867 3055/1920], all of the Institute of Physics, Chinese Academy of Sciences (195)

A Discussion about the Quality and Growth Parameters of Czochralski Ruby......Yu Xianduo [0827 0341 6995], Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Sciences (198)

The Introduction and Development of Crystalline Slip Dislocations in the Production of Silicon Devices......Xiao San [5135 2809], Institute of Physics, Chinese Academy of Sciences; Lu Yincheng [4151 0936 6134], Beijing Municipal Institute of Semiconductors (200)

Theory of the Images Formed by a Plane Surface and a Plane-Parallel Plate......Li Yangeng [2621 1693 6342], Naval Engineering College (203)

Experimental Techniques and Methods

Ultra-Low Frequency Measurement of Ferroelectric Hysteresis Loop......Wang Yongling [3769 3057 0109], Lin Shengwei [2651 4141 5898] and Xu Lihua [1776 7787 5478], all of the

Shanghai Institute of Silicates, Chinese Academy of Sciences (207)

Temperature Measurement of p-n Junctions Using Forward Voltage Characteristics......Zhang Kaixun [1728 7030 6676] and Wang Xiang [3769 0686], both of the Institute of Mechanical and Industrial Automation, First Ministry of Machine Building (213)

Some Applications of a High-Repetition Rate kW Nd^{3+}: YAG Laser......Zhu Jinsong [2612 0513 2646], Tan Yunpeng [6151 0061 7720], Yang Zhen [2799 7201] and Wang Yening [3769 2814 1380], all of the Department of Physics, Nanjing University (217)

Application of Ion Backscattering Techniques to Surface Microanalysis......Cheng Huansheng [2110 3562 3932], Tang Jiayong [3282 1367 6978], Xu Zhiwei [1776 1807 0251], Yang Fujia [2799 4395 1367], Zhao Guoqing [6392 0948 1987] and Zhou Gongying [0719 7255 7336], all of Fudan University (220)

Monolayer Surface Analysis by Low Energy Ion Scattering Spectroscopy and Static Secondary Ion Mass Spectroscopy...... Zhao Liangzhong [6392 5328 0112], Institute of Chemistry, Chinese Academy of Sciences (225)

Detection of Pulsed Gravity Waves in Thermal Noise...... Wu Yongsheng [0702 3057 3932], Institute of Physics, Chinese Academy of Sciences (232)

On Weak Signal Processing Techniques......Weak Signal Detection Group, Institute of Physics, Chinese Academy of Sciences (236)

Measurement and Application of the Gyromagnetic Ratio of the Proton......Magnetic Standards Group, Electromagnetic Division, National Institute of Metrology (241)

Perturbed Angular Correlation and Its Application...... Li Changlin [2621 7022 2651], Institute of Modern Physics, Chinese Academy of Sciences (246)

9717
CSO: 4008

Architectural Engineering

AUTHOR: LI Guohao [2621 0948 6275]

ORG: None

TITLE: "Bending and Twisting of Box Girders with Deformable Trapezoidal Cross Sections"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 1-13

TEXT OF ENGLISH ABSTRACT: Box girders of deformable trapezoidal cross sections are widely used in bridge engineering. In this paper, for the purpose of facilitating the stress and vibration analysis, differential equations of horizontal bending and twisting for statical and dynamical loadings are derived. Formulae for normal and shearing stresses are also given in detail. The torsion of indeformable cross sections and the deformation of deformable cross sections, as well as the relation between them, are analyzed. Approximate methods for solving the differential equations are discussed.

AUTHOR: XIANG Haifan [7309 3189 1581]
HU Shide [5170 0013 1795]

ORG: None

TITLE: "A Practical Method for Earthquake-Resistant Calculation of Continuous Arch Bridges"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 14-32

TEXT OF ENGLISH ABSTRACT: In this paper a practical method for earthquake-resistant calculation of continuous arch bridges frequently encountered in the earthquake regions of our country is proposed as an extension of the research of the earthquake-resistant calculation of single span arch bridges presented in a previous paper. The simplified mechanical models are derived from systematic analyses of the dynamic behavior and the laws of response of continuous arch bridges. The earthquake response coefficients of continuous arch bridges are computed with the aid of "MRC-3" and "MRC-4" programs. Finally, the method is applied to an example and the principles of strengthening continuous arch bridges to increase their earthquake-resistance are discussed.

AUTHOR: GU Shaode [7357 4801 1795]
LI Zongrong [2621 1350 3768/1369]

ORG: None

TITLE: "A Study on the Use of Photoelastic Method for the Determination of Stress Intensity Factors K_I"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 33-48

TEXT OF ENGLISH ABSTRACT: A new investigation on the principle involved in the use of the photoelastic method for the determination of stress intensity factor K_I is made. It is proposed that the local stress field at the crack front consists of a singular field and a finite field. The results thus obtained can be applied to cracks under complicated conditions which so far cannot be solved effectively by other approaches. The fundamental equations applicable to photoelastic analysis are herein developed and several appropriate programs of experimental analysis are provided. In addition, a review is made for the five methods of analysis which are in current use in our country and abroad. Analysis is made on resulting errors in some methods as well as the range of applications of these methods. In this paper the "exact solution" method is used to solve the problem of how to reflect the parameter K_I at crack tip

[Continuation of TONGJI DAXUE XUEBAO No 1, Mar 80 pp 33-48]

through the parameters in the "reliable" region. The difficulties in measuring the parameters at crack tip because of "tip blunt" are thus overcome. The validity of the assumptions made in this paper is examined by a practical example with theoretical analytical expressions (using the Westergaard complex stress function) as well as by the analysis of photoelastic experimental results. Finally, the experimental results of a two-dimensional and a three-dimensional problem are utilized for further examination on the method here developed, and this gives further evidence of the effectiveness of the proposed method.

AUTHOR: DING Zuquan [0002 4371 3123]
BAO Naikeng [7637 0035 6972]

ORG: None

TITLE: "Quantitative Determination of Three-Dimensional Displacements and Vibration Using Holographic Interferometry"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 49-62

TEXT OF ENGLISH ABSTRACT: The application of holographic interferometry to the quantitative measurement of two- or three-dimensional displacements and 2-D vibration using the multiple-hologram technique and an overdetermined set of simultaneous equations of the single-hologram technique is studied. The results of the study are presented in the four experiments. In this paper, also briefly discussed are the basic equations, interpretation of fringes, experimental methods and devices of quantitative measurement of holographic displacement. Finally, a method for further improvement and perfection is proposed.

AUTHOR: ZHU Bolong [2612 0130 7893]
WU Mingshun [0702 2494 5293]
ZHANG Kunlian [1728 3824 5114]

ORG: None

TITLE: "A Study of Hysteretic Curve of Reinforced Concrete Members under Cyclic Loading Taking into Account Local Contact Effects of Cracked Section"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 63-75

TEXT OF ENGLISH ABSTRACT: In current methods for the calculation of the moment-curvature hysteretic curve, there are two basic assumptions concerning concrete in compression:

(a) Cracked concrete, when subjected to compression under reloading, works as if uncracked.

(b) For concrete in compression zone a stress-strain relation for repeated axial compressive cyclic loading is adopted instead of that for reversed loading. Based on the above assumptions, the calculated moment-curvature curve under a large cracked deformation will present a pinching point; however such a point does not exist at the corresponding position in the experimental curve. Due to the influence of secondary moment, the calculated result for

[Continuation of TONGJI DAXUE XUEBAO No 1, Mar 80 pp 63-75]

load-deflection curve errs more than that for moment-curvature curve. If we consider the local contact effects of the cracked section during reloading, the pinching point will disappear from the calculated hysteretic loops.

Based on the test data of local contact effects of the cracked section, we propose in this article a new equivalent concrete stress-strain relation for reversed loading. With the use of this relation, instead of that for repeated loading, good agreement between experimental and theoretical results of hysteretic loops can then be obtained.

AUTHOR: JIANG Dahua [5592 1129 7520]

ORG: None

TITLE: "On the Load-Carrying Capacity of Concrete Pavements"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 76-86

TEXT OF ENGLISH ABSTRACT: The load-carrying capacity of concrete pavement under a central load is investigated. The pavement is treated as a rigid-plastic slab of infinitely large size resting on an elastic subgrade. It is shown that due to the presence of axial thrust and the gradual cracking of the section, a plain concrete element can deform significantly without losing its flexural strength. Therefore, redistribution of bending moment in a large plain concrete slab is possible as has been observed in the experiments.

A method for the determination of the position of yield lines as well as the load-carrying capacity is also proposed.

AUTHOR: SUN Yeyang [1327 2814 2254]
YU Andong [0151 1344 2639]
JIN Ruichun [6855 3843 2797]
JIANG Lusheng [5592 7120 3932]

ORG: None

TITLE: "The Use of a Combined Member-Story Model for Analyzing Earthquake Responses of Tall Buildings"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 87-98

TEXT OF ENGLISH ABSTRACT: In this paper, a member-story model for analyzing the inelastic responses of tall buildings subjected to earthquake excitations is presented. The authors have also derived: (1) the inelastic and geometrically nonlinear stiffness matrix of a member with two rigid zones at its ends, using a one-component model of a member and considering axial, shear and bending deformations; (2) the spatial stiffness matrix with three degrees of freedom for every floor corresponding to two components of displacement and one of rotation considering the interaction of shear walls and frames; (3) the spatial stiffness matrix with six degrees of freedom for every floor corresponding to three components of displacement and three of rotation. In addition,

[Continuation of TONGJI DAXUE XUEBAO No 1, Mar 80 pp 87-98]

the concept of transition stiffness dealing with the turning points of hysteresis loops is also introduced. According to the model mentioned above, a program has been worked out and used in the design of some tall buildings.

AUTHOR: SHEN Rongfang [3088 2837 5364]

ORG: None

TITLE: "Solution of Transportation Problems by Primal-Dual Algorithm and Its Program"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 99-112

TEXT OF ENGLISH ABSTRACT: In this paper the procedure of computation for the solution of transportation problems by primal-dual algorithm is discussed. Its advantage lies in considerable reduction of the amount of computational work by as much as 50 percent as compared with the conventional algorithm used in solving such problems. A program written in "719" algorithmic language and its explanation is presented in this paper. A technique for remembering the number of positive variables and their positions is adopted in the program, thereby saving a great deal of running time. On a "719" digital computer it takes about 15 seconds to solve a transportation problem with approximately 100 variables including time for printing the answer. For this type of computer over 6000 variables can be admitted. If a program of the simplex algorithm were adopted, it would take more than two minutes to solve the same problem and only

[Continuation of TONGJI DAXUE XUEBAO No 1, Mar 80 pp 99-112]

a few hundred variables could be admitted. In the case of problems with thousands of variables, the primal-dual algorithm will be far more efficient.

AUTHOR: LIN Xiuxian [2651 4836 6343]

ORG: None

TITLE: "A Study of Traffic Conversion for Flexible Pavement Design"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 113-123

TEXT OF ENGLISH ABSTRACT: This paper presents briefly the research results on traffic conversion for flexible pavement design. Based on a large amount of accumulated data obtained by measurements from roads in our country over a period of many years and by taking the surface deflections as the principal criterion for pavement design, a traffic conversion equation is developed. This equation has been adopted by the revised "Specifications of Highway Pavements Design" in our country.

AUTHOR: ZHOU Weijun [0719 4850 6874]

ORG: None

TITLE: "XYZ Systemized Architectural Design for Housing Construction"

SOURCE: Shanghai TONGJI DAXUE XUEBAO [JOURNAL OF TONGJI UNIVERSITY] in Chinese No 1, Mar 80 pp 124-143

TEXT OF ENGLISH ABSTRACT: In order to speed up the task of the Four Modernizations, it is deemed necessary to carry out the huge housing construction works by means of fairly advanced industrialized methods. But before commencing with the work of industrialization, it is imperative to provide certain systemized architectural designs with a view of establishing certain criteria of standardized architectural elements so as to form a complete system of plans capable of fulfilling the various housing requirements. The author has made a preliminary study in this respect and has found a series of X, Y, Z combinations with a limited number of basic architectural elements resulting in a large number of housing arrangements capable of satisfying the various up-to-date housing needs.

The author's scheme of design has won the third prize in the Shanghai Urban

[Continuation of TONGJI DAXUE XUEBAO No 1, Mar 80 pp 124-143]

Housing Design Competition and commendatory prize in the National Urban Housing Design Competition in 1979.

9717
CSO: 4009

Geology

AUTHOR: CHEN Lirong [7115 7787 2837]
YU Xu [0205 2485]
SHI Yingmin [2514 5391 3046]
XU Wenqiang [1776 2429 1730]
SHEN Shunxi [3947 7311 0823]
LI Kunye [2621 0981 2814]
ZHENG Kaiyun [6774 7030 0061]
HUANG Yatian [7806 7161 1131]

ORG: All of the Institute of Oceanology, Chinese Academy of Sciences

TITLE: "Glauconite in the Sediments of the East China Sea"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 205-217

TEXT OF ENGLISH ABSTRACT: Glauconite in 233 bottom samples from the shallow portion of the East China Sea were studied. In this region, most glauconite is in various forms of pellets, but some is found in cavities of foraminiferal tests, ostracod shells, molluscal shells and bryozan zooecial chambers. The color of the glauconite varied considerably, ranging from black to light yellow. Most grains are black to dark green, some are yellow-gree, and a few are light yellow. The surface pattern of the glauconite grains is either shallow sutures

[Continuation of DIZHI KEXUE No 3, Jul 80 pp 205-217]

or a network of cracks. They show an aggregate polarization, with an average index of refraction of 1.578-1.615 and a biaxial negative interference figure, with 2 V about 10^{o}. The specific gravity varies from 2.49 to 2.67. The X-ray analysis revealed that glauconite has a micaceous structure between the dioctahedral and trioctahedral types. They can be regarded as a disordered interstratification of nonexpanding and expanding layers. The amount of the expanding layers is about 21 percent. The chemical composition of the glauconite is Al_2O_3 4.95-5.01 percent, Fe_2O_3 19.49-23.82 percent, FeO 1.44-2.00 percent and K_2O 2.46-4.48 percent. Their crystal forms and thermal characteristics are very similar to those of micaceous clay minerals.

Glauconite is widely distributed in the sediments of the East China Sea, but its content is generally very low. Only in one sample did the glauconite content amount to five percent of the total sediment. In most cases only a few grains were found.

Glauconite is distributed chiefly in the middle part of the East China Sea, while only a small amount of glauconite can be found in its eastern and western parts. The middle part of the investigated area may be divided into two regions with latitude 30^{o}N as the dividing line. The content of glauconite in the southern region is greater than that in the northern region. It is worthwhile

[Continuation of DIZHI KEXUE No 3, Jul 80 pp 205-217]

to note that glauconite as an organism filling is mainly found in the southern portion of this area.

There is an inverse correlation between the distribution of glauconite and that of authigenic pyrite.

Our research shows that the well-sorted coarse sediments (0.1-0.25 mm and 0.25-0.5 mm) with a bottom temperature of 17-18ºC, a salinity of 34.1-34.4 percent, a pH of 8-9 and a depth of 100-160 m are favorable to the formation of glauconite in the region of relict sediments where modern sedimentation appears to be very slow.

The parent materials of glauconite as organism filling are micaceous clay fraction with a small amount of mineral fragments such as quartz and mica. The shells are often filled with these materials. The organic decay within shells probably created a micro-environment favorable to glauconite formation. The parent materials of glauconite pellets are biotites.

AUTHOR: WANG Yao [3769 1031]
PAN Zhengfu [3382 2973 3940]

ORG: None

TITLE: Petrography of Ordovician Carbonate Rocks and the Characteristics of Sedimentary Facies in the Central Part of the North China Platform"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 218-230

TEXT OF ENGLISH ABSTRACT: Based upon the petrographic studies of Ordovician carbonate rocks in the Quyang region, Hebei Province, the sedimentary properties of the widespread tidal flat with evaporatic carbonate in the north China platform are discussed in this paper.

The Ordovician series found in the Quyang region is entirely made up of carbonate rocks and can be divided into 10 main types of carbonate lithofacies. In supratidal zones there are brecciated dolomite, gypsum-bearing dolomite, laminated dolomite and stromatolitic dolomite. Mudcracks, desiccation cracks, birdseye and gypsum are widely developed in these dolomites. The brecciated dolomite is composed of fragments of mudcrack; in the intertidal zones there are micrite, wormkalk, pelmicrite, biomicrite and the incomplete mudcracks

[Continuation of DIZHI KEXUE No 3, Jul 80 pp 218-230]

(usually deformed by weathering), desiccation cracks, solution mottles and burrows as well. It is found that the formation of "mottles" was a result of selective replacement of sedimentary-diagenetic fabrics by dolomite.

In subtidal low-energy zones there are pelmicrite, biomicrite and bio-intraclast micrite. Here the biodetritus are abundant, while the dolomitezation is rather weak. Finally, in subtidal high-energy zones there are biosparite and biointrasparite, which occur in the form of isolated and irregular small beaches under favorable conditions. The contents of trace elements are different for different lithofacies, for instance the content of Sr reaches its maximum in the subtidal zone whereas the contents of Ti, Zr, Ni and Ba are highest in the supertidal zone.

The Ordovician carbonate rocks of the Quyang region distinctly exhibit cyclic and rhythmic features in a vertical section. As far as we know, there are two categories of rhythm with five typical rhythms that differ from each other in both distribution and constitution.

AUTHOR: SHEN Buming [3088 2975 2494]
ZHENG Xuezheng [6774 1331 2973]
YING Yupu [2019 5148 3184]

ORG: None

TITLE: "On the Superstructure of Plagioclases--A Discussion on Parameters and Vectors of E Diffraction"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 231-241

TEXT OF ENGLISH ABSTRACT: Based upon Megaw's model of superstructure of plagioclase (a_0, $9b_0$, $2c_0$), we studied some e diffractions of this mineral and proposed for e-plagioclases ($An_{33.3}$ to An_{72}) a correction formula of e diffraction $\delta a + \delta c = 160^\circ + N^\circ$, where N is the number of increased anorthite-like subcells more calcic than An_{50}. Therefore, $\delta a + \delta c$ will be increased by one degree for each increased anorthite-like subcell after An_{50}.

If the proposed formula holds true, we may establish the following group of equations:

$$\delta a + \delta b = 40^\circ$$
$$\delta a + \delta c = 160^\circ + N^\circ$$

$$[d_{theor.}]_b = \frac{1}{2|\Delta s|} = \frac{1}{2\sqrt{(ha^*)^2 + (lc^*)^2 + \ldots}}$$

where a^*, b^*, c^*, α^*, β^*, γ^* are reciprocal parameters of An_{80} with typical $I\bar{1}$ lattice.

The calculated values of ($\delta a + \delta c$) of 20 e-plagioclases are shown. The calculated values coincide well with the observed ones, and the error of the mean square root is only ± 2°. Therefore, it is necessary to rewrite $\delta a + \delta c = 160°$ as $\delta a + \delta c = 160° + N°$. An obvious deviation of e-diffraction parameters, however, is noted for the plagioclases more sodic than $An_{11.3}$ or more calcic than An_{72}, which is caused by the predominance of $C\bar{1}$ or $P\bar{1}$ units over $I\bar{1}$ units in their lattices.

According to Megaw's superstructure model, we get An% = N/18.100, where N is the number of anorthite-like subcells in the supercells. Therefore the formula of width of the anorthite-like subcell domain in the direction of the b axis is given as follows:

$$[d_{theor.}]_b = \frac{b}{2} \cdot n$$

where n is the number of anorthite-like subcells in the direction of the b axis and b is the length of the cell edge in the direction of the b axis of An_{80} with typical $I\bar{1}$ lattice = 12.87Å. Hence, we obtain

$$[d_{theor.}]_b = 6.44 \cdot \frac{An\% \; 9}{100} .$$

It can be seen from the table that all the calculated values of $[d_{theor.}]_b$ coincide fairly well with the observed ones. Therefore, it is appropriate to take Smith's T (periodicity of supercells) as the width of an anorthite-like domain in the supercells on b axis. Moreover, the calculated values also agree well with the observed ones in the diagrams of T(d) versus An%, with the exception of $An < 11.3$ or $An > 72$. We hold that the e-diffraction of plagioclase is related to the anorthite-like domains.

As is well known,

$$\begin{aligned} s &= (h + \delta h)a^* \pm (k \pm \delta k)b^* \pm (l \pm \delta l)c^* \\ &= (ha^* + kb^* + lc^*) + (\pm \delta ha^* \pm \delta kb^* \pm \delta lc^*). \end{aligned}$$

Hence, $s = s_0 + \Delta s$. When $\Delta s = 0$ (or δh, δk and δl equal to zero), the above equation corresponds to the condition of normal Bragg's diffraction; when $s \neq 0$, it corresponds to the non-Bragg's diffraction.

Because we always get $\delta a + \delta b = 40°$ and $\delta a + \delta c = 160° + N°$, as a result we have

$$\delta h + \delta k = \frac{\delta a}{360°} + \frac{\delta b}{360°} = \frac{\delta a + \delta b}{360°} = \frac{40°}{360°} = \frac{1}{9}; \; 2\delta h - \delta l = \frac{2\delta a}{360°} \cdot \frac{-180° - \delta c}{180°}$$

[Continuation of DIZHI KEXUE No 3, Jul 80 pp 231-241]

$$= \frac{-180^\circ + (a + c)}{180^\circ} = \frac{-180^\circ + 160^\circ + N^\circ}{180^\circ} = -\frac{1}{9} + \frac{N^\circ}{180^\circ} .$$

Consequently, the periodicity of all σ-plagioclases is 9, whereas only in the case of $N = 0(An_{33.5} - An_{50})$ will that of $2\delta h - \delta l$ be 9, because the latter changes with the composition of plagioclases.

AUTHOR: Li Dazhou [2621 6671 0719]

ORG: None

TITLE: "Characteristic Patterns of Zircons in the Precambrian Metamorphic Rocks from the Wuyang District, Henan Province, and Their Applications in Reconstructing the Original Rocks"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 242-248

TEXT OF ENGLISH ABSTRACT: Zircons collected in Precambrian metamorphic rocks from Wuyang district, Henan Province, were studied and their characteristic patterns are used to reconstruct the original rocks of metamorphic rocks under investigation. Thus the results obtained are satisfactory, especially in such fields as the differentiation between the amphibolites and plagioclase amphibolites metamorphosed from igneous rocks and those from sedimentary rocks. Based upon the characteristic patterns of zircons, a lithological classification of the original rocks is suggested for the Precambrian metamorphic rocks.

AUTHOR: ZHANG Kuiwu [1728 7608 2976]

ORG: None

TITLE: "Optical Studies of the Feldspars from Gandes Granitic Rocks"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 249-255

TEXT OF ENGLISH ABSTRACT: Granitic rocks of different ages are extensively distributed along the Gandes Chain. They are intimately genetically related both in origin and space. The rocks consist mainly of diorites, granodiorites and granites, with the predominance of granodiorites in this granite belt. In general, their distribution has a tendency to change the rocks' nature from basic to acidic from south toward north. The optical properties of feldspars indicate that alkali feldspar ordering shows itself a systematical increase along this direction just as the changes of host rocks in the composition of SiO_2, K_2O and the volatiles. The variation of the An component of plagioclase is also in compliance with the decreasing of CaO, FeO + Fe_2O_3 and MgO of the host rocks. The ordering of alkali feldspars generally can be regarded as a complex function of the chemical composition of host rocks, the dimension of rock masses and the amount and component of volatiles. Among them, it is

[Continuation of DIZHI KEXUE No 3, Jul 80 pp 249-255]

believed, the last one is most important, especially for boron. Obviously the types of rocks could play an important role in the An content of plagioclases.

AUTHOR: HE Ziai [6320 5261 1947]
YANG Hong [2799 1347]
ZHOU Jingcai [0719 4842 2088]

ORG: All of the Eighth Brigade of Geological Exploration, Ministry of Geology

TITLE: "The Middle Triassic Reef in Guizhou Province"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 256-264

TEXT OF ENGLISH ABSTRACT: This paper deals with two kinds of reefs: barrier reef and atoll. Our research indicates that most of the organisms are Solenoporacae belonging to red algae and that the growth base is composed of algal fragments and algal nodules, which are in the form of thick growth and layer upon layer superimposing on the older algal beds.

The barrier reef found in linear distribution in the studied region runs in hundreds of kilometers to form a chain of reefs steeply dipping seaward. Therefore, the narrow jogsaw-like edge of fore-reef facies together with the slip slope and talus give a distinct picture of zigzag reef margin, which gradually developed as an algal flat with an extensively distributed blue-algal sheet

[Continuation of DIZHI KEXUE No 3, Jul 80 pp 256-264]

toward the back-reef. The thickness of the flat is usually doubled as compared with that if its flank. Moreover, the Anisian and Ladinian reefs occurred more-or-less along an identical line and exhibited a clear inherency that is probably related to the ancient basement faults.

Due to its close relation with the ancient structures, the atoll is chiefly situated at the intersection of the N-S and E-W tectonic belts. The reef bodies are formed on the base of a rising carbonate buildup associated with the Upper Permian reef of Wujiaping formation.

The authors divided the reef into the following seven facies zones: (1) semi-abyssal basin, (2) basin margin, (3) carbonate platform (high energy zone), (4) carbonate platform edge (reef ridge), (5) algal flat, (6) restricted marine carbonate platform and (7) eidal flat of carbonate platform.

AUTHOR: YIN Hongfu [3009 7703 4395]

ORG: Wuhan College of Geology

TITLE: "Triassic Paleobiogeography and the Continental Drift"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 265-278

TEXT OF ENGLISH ABSTRACT: This article demonstrates from the viewpoint of paleobiogeography the nonexistence of the Atlantic Ocean, the union of the southern continents into the Gondwanaland, and hence the presence of the Pangaea in Triassic. After giving a short critique on the traditional treatment of the Triassic Tethys in paleogeographic maps, this article discusses the differences of benthonic organisms between the southern and northern margins of the Tethys, the distribution of abyssal faunas and the direct contacts of utterly different biological-petrographic facies due to subduction of the oceanic crust, all of which stand for the existence of a vast Tethys ocean during Triassic as suggested by the theory of the continental drift. A special section is devoted to the Triassic grand triangle occupying parts of Sichuan, Gansu, Qinghai and Xizang (Tibet) of China. Summing up all available data of biostratigraphy, paleobiogeography and various aspects of Triassic drifting, the author concludes

[Continuation of DIZHI KEXUE No 3, Jul 80 pp 265-278]

that the triangle was a northern part of the Triassic Tethys, while the Xizang-Western Yunnan microcontinent was a Noah's Ark drifting northeastward and collided and combined with the Eurasian plate in Late Triassic, thus bringing an end to the oceanic development of the triangle.

AUTHOR: CHEN Ruijun [7115 3843 0689]

ORG: None

TITLE: "Grain-Size Distribution and Surface Texture of Quartz Grains in Sedimentary Rocks and Their Relation to Sedimentary Environment"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 279-286

TEXT OF ENGLISH ABSTRACT: The grain-size analysis of modern and ancient sediments and the treatment of data by Folk's formula give the following parameters: the standard deviation (σ_1), mean size (M_z), kurtosis (K_g), skewness (SK_1), simple skewness measure (α_s) and simple sorting measure (S_{Os}). Using these grain parameters we constructed the log-probability curves and scattered diagrams of both SK_1-σ_1 and α_s-S_{Os}. According to the calculation after Sahu's discriminant and the synthetic analysis of the data, four types of sedimentary environments were established as follows: (1) deltaic distributary mouth bars arenaceous sediment (sample nos 1, 5 and 8), (2) fluvial sediment (sample no 6), (3) delta front arenaceous sediment (sample no 10) and (4) beach arenaceous sediment (sample nos 2 and 3).

In addition, the surface features of quartz grains in the samples were studied

[Continuation of DIZHI KEXUE No 3, Jul 80 pp 279-286]

under a scanning electron microscope. The resulting environmental interpretation coincides fairly well with that derived from grain-size analysis, suggesting that the combination of the two approaches mentioned above is an important and effective way to analyze the sedimentary environments, especially the reconstruction of the ancient sedimentary environment.

AUTHOR: ZHANG Naixian [1728 0035 8300]
TIAN Xingyou [3944 5281 2589]

ORG: None

TITLE: "Study of a Mixed-Layer Clay Mineral from the Liaohe Basin of Northeast China and Its Sedimentary Environment"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 287-291

TEXT OF ENGLISH ABSTRACT: X-ray diffraction analysis shows that three fresh clay samples collected from cores of Oligocene Sha-3 members in a region of northeast China are irregular mixed-layer illite-montmorillonite minerals. The respective proportions of both layers were also estimated from the diffraction diagrams. It is suggested that the presence of mixed-layer minerals reflects to a certain extent the changes in the sedimentary environment and physicochemical conditions during their formation.

AUTHOR: WEN Chuanfen [5113 0278 5358]

ORG: None

TITLE: "Study of the Jianshi and Leshan Siderites"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 292-295

TEXT OF ENGLISH ABSTRACT: Siderite specimens collected from Jianshi County, Hubei Province, and Leshan County, Sichuan Province, have been studied by X-ray diffraction analysis, wet chemical analysis, electron probe analysis and microscopic examination, and the following minerals were recognized: kamacite, taenite, plessite and a few silicate minerals. In addition, Jianshi siderite also contains troilite, cohenite, magnetite and limonite.

According to the Widmanstatten structure, the width of the kamasite band (0.5-0.76 mm for Jianshi siderite, 0.1-0.5 mm for Leshan siderite) and content of nickel (Jianshi siderite--7.8 percent, Leshan siderite--8.64 percent), the Jianshi specimen is considered to be a medium-grained octahedron siderite and the Leshan specimen a fine-grained octahedron siderite.

AUTHOR: TAO Kejie [7118 0344 2212]

ORG: None

TITLE: "Weiyuan Mesosiderite"

SOURCE: Beijing DIZHI KEXUE [SCIENTIA GEOLOGICA SINICA] in Chinese No 3, Jul 80 pp 296-298

TEXT OF ENGLISH ABSTRACT: The meteorite described in this paper was found in Beizhai Commune, Weiyuan County, Gansu Province, China. It is located at λ 104° 19'27"E, Ψ35°16'28"N. The Weiyuan meteorite is composed mainly of orthopyroxene, anorthite, kamatite, taenite, rutile, olivine, troilite and chromite, etc. According to its mineralogical and chemical compositions and structural features, it should belong to the type M mesosiderite. This is the first discovery of this kind of meteorite in China.

9717
CSO: 4009

Hydraulic Engineering

AUTHOR: CONG Shuzheng [0654 2885 6927]
TAN Weiyan [6223 4850 3508]
HUANG Shouxin [7806 1343 0207]
XU Yingbo [1776 2503 3134]
ZHANG Weiran [1728 4850 3544]
CHEN Yuanze [7115 3293 3419]

ORG: CONG and ZHANG both of the East China College of Hydraulic Engineering; TAN and XU both of the Nanjing Institute of Hydrology, Ministry of Water Conservancy; HUANG of the Water Conservancy and Hydroelectric Power Research Institute; CHEN of the Fourth Engineering Bureau, Ministry of Electric Power

TITLE: "Statistical Testing Research on the Methods of Parameter Estimation in Hydrological Computation"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 3, 17 Jun 80 pp 1-15

TEXT OF ENGLISH ABSTRACT: Based on the method of statistical testing, this paper analyzes and compares the methods of moments, maximum likelihood and curve-fitting in the case of Pearson type III distribution. For the curve-

[Continuation of SHUILI XUEBAO No 3, 17 Jun 80 pp 1-15]

fitting method, a comprehensive comparative analysis is made on seven criteria of curve fitting and mainly on two of them--the least squares criterion φ_1 and the least absolute-values criterion φ_2, as well as on the various plotting position formulas. Moreover, the role of historical flood is also examined. The results of calculation indicate that the quantity X_p derived from the moment method has a much smaller expected value EX_p than does the true value x_p^0 of the population, and that this is on the unsafe side. The maximum likelihood method yields somewhat better results but it cannot be accepted as a universal method because it yields no solution to the Pearson III curve when $C_s \geq 2$. For the curve-fitting method, it is found that the result is substantially affected by the criterion used for curve fitting. In general, φ_2 criterion associated with the Weibull formula (abbr. in φ_2-W) may give slightly greater EX_p than x_{po} and smaller root-mean-square error σX_p. Consequently, φ_2-W curve-fitting method proves to be the better one among all the methods available. The use of historical flood would usually increase EX_p and decrease σX_p and is, therefore, an important means of improving the computational results.

AUTHOR: LIN Bingnan [2651 4426 0589]
ZHAO Xuehua [6392 7185 5478]
SHI Linbao [2457 7792 1405]

ORG: LIN of the Water Conservancy and Hydroelectric Power Research Institute, Qinghua University; ZHAO and SHI both of the Institute of Estuarine and Coastal Engineering Research, Zhejiang Province

TITLE: "Effects of Closing Off an Estuary on the Tides in an Adjoining Bay"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 3, 17 Jun 80 pp 16-26

TEXT OF ENGLISH ABSTRACT: This article describes a mathematical model for the tides in a bay. The objective is to anticipate with this model the effects that closing off of an estuary may have on the tides in an adjoining bay. As the area investigated is 105 km long and 25 to 65 km wide, a depth-integrated, two-dimensional model is employed. Schemes for finite-difference computations have been derived by applying the theory of characteristics to the full equations of motion with the convective acceleration terms retained. Altogether 12 types each of land and water boundary conditions have been considered.

In the first place, tides in the bay under natural conditions are modeled. By

[Continuation of SHUILI XUEBAO No 3, 17 Jun 80 pp 16-26]

adjusting the resistance coefficient and by proper schematization of the topography of the bay, satisfactory reproduction of the tides can be achieved. Although the maximum deviation of the computed tidal stage from the observed is 0.26 m at high tide at a station where the tidal range is 6.20 m, the phases of computed and observed tides are practically identical at all tidal stations. There is a station where depth-integrated current data for a complete tide have been recorded. It is somewhat surprising that the current data are closely modeled in magnitude, phase and direction.

Based on the successful modeling of the natural tides, the closure of the estuary is next simulated and the corresponding tides in the bay computed. It is found that high water at the closure dam will come sooner than under natural conditions and that the high tide is lowered and the low tide elevated so that the tidal range at the closure dam is reduced somewhat.

AUTHOR: TAO Tongkang [7118 0681 1660]

ORG: Nanjing Hydraulic Engineering Research Institute

TITLE: "Mathematical Model of Unsteady Seepage Flow in Embankment Dams"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 3, 17 Jun 80 pp 27-36

TEXT OF ENGLISH ABSTRACT: In this paper, we mention the usual mathematical models of unsteady seepage flow in embankment dams from a physical concept for those to date in our country and foreign countries. However, according to the physical meaning of drainage porosity μ, that which usually results from adopting a final steady value would not satisfy the physical course of unsteady seepage flow. Thus we propose different values of μ in corresponding time intervals suitably chosen.

Using many computations by the finite element method for each mathematical model and by analyzing the position of free surface, distribution of flow field and stability of upstream slope, the physical configuration of unsteady seepage flow in embankment dams is satisfied by the equation given. This, in association with the boundary condition of seepage discharge of free surfaces, is compared with the experimental data of the sand model and is thus verified.

AUTHOR: YE Jinhan [5509 6855 3352]
WU Mingjiang [0702 6900 3068]
JI Liangjie [1323 5328 2638]
YANG Ziwen [2799 1311 2429]

ORG: YE and WU both of the Water Conservancy and Hydroelectric Power Research Institute; JI and YANG both of the Research Division, Chengdu Institute of Design and Exploration

TITLE: "Determination of the Deformation Characteristics of Rock Masses by Radial Jacking Tests"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 3, 17 Jun 80 pp 37-51

TEXT OF ENGLISH ABSTRACT: This paper describes the testing results of determining the deformation characteristics of rock masses by radial jacking tests conducted in two hydroelectric projects, Yingxiuwan and Yilihe III. The influence of the loading length on the extent and depth of deformation was investigated. It indicates that the measured rock deformation should be modified with the given formula when the loading length is less than three times the diameter of the test tunnel. In addition, the validity of the principle of superposition

[Continuation of SHUILI XUEBAO No 3, 17 Jun 80 pp 37-51]

is studied in connection with the feasibility of using the elastic theory in rock mechanics.

In the present paper a comparison between the results obtained from whole-sectional loading tests and partial loading tests (the latter is equivalent to the plate bearing test in an exploratory adit) indicates that in the latter cases the effect of the periphery of the test tunnel whould be considered and calculated according to the formula.

AUTHOR: ZHANG Youtian [1728 2589 1131]
ZHANG Wugong [1728 2976 0501]

ORG: Both of the Water Conservancy and Hydroelectric Power Research Institute

TITLE: "Static Calculation of Water Load Acting on Tunnels"

SOURCE: Beijing SHUILI XUEBAO [JOURNAL OF HYDRAULIC ENGINEERING] in Chinese No 3, 17 Jun 80 pp 52-62

TEXT OF ENGLISH ABSTRACT: For a hydraulic tunnel, water load is the main concern. In the static calculation of such a tunnel, it is a common practice to treat the water load as a boundary force without consideration of the time factor of groundwater. This will result in considerable error in some cases. This paper proposes a method to take the water load as a field force and to make static calculations of the adjoining rock mass and lining of the tunnel by considering the time dependence of water load on excavating and lining of the tunnel. Due to geological tectonic action, the rock mass is a medium invariably containing fissures. The calculation, by way of seepage field, allows this feature to be considered, and a corresponding mathematical model is used accordingly. In the static calculation, the rock mass is assumed to be an isotropic elastic medium, and consideration is made of the effect of joints and

[Continuation of SHUILI XUEBAO No 3, 17 Jun 80 pp 52-62]

fissures, as well as of the dependence of the water load on the relative periods of tunnel excavating, supporting and lining. A special computer program, SJDI, is prepared on the basis of the above principle. This program also has the function of calculating stress and displacement fields at various periods of tunnel excavating and supporting under the actions of a seepage field and initial stress field.

9717
CSO: 4009

Metallurgy

AUTHOR: LI Yuanzhou [2621 6678 3166]

ORG: None

TITLE: "Dynamics of Bath Movement in Oxygen Bottom-Blown Converter"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 3, May 80 pp 1-9

TEXT OF ENGLISH ABSTRACT: This paper attempts to discuss the dynamics of bath movement in the oxygen bottom-blown converter. A parameter is suggested for selecting the oxygen pressure, called the nozzle delivery pressure ratio $\varepsilon'_a \leq 0.25$. An equation is derived for the quiet-blowing condition, which shows the relation to be obeyed, in order to prevent the injected oxygen flow changing from "gas-bubbling" to "gas-streaming." Another equation is given for good bath circulation, expressing the value of F'_r to be kept. The formula derived for determining the converter volume defines the relation to be kept among bath diameter, oxygen flow, nozzle number, charge weight and converter volume, so as to prevent splashing.

AUTHOR: ZHANG Bishe [1728 1801 6376]

ORG: None

TITLE: "Characteristics of Coarse Nonmetallic Inclusions in Rimmed Steel"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 3, May 80 pp 10-17

TEXT OF ENGLISH ABSTRACT: The present paper shows that lamination defects in rimmed steel sheets are caused mainly by coarse non-metallic inclusions in the 0.5 to 5 mm range. Using samples of galvanized sheets ≤ 0.5 mm thick, the quantity, size, distribution, composition and structure of the coarse impurities have been investigated. They are found to be entirely different in nature from smaller inclusions. Experiments have also shown that an open type rimmed steel ingot of 7.1 tons would contain 100 to 1000, and a closed type ingot 5 to 30 inclusions of this kind, enough to cause rejection of a large proportion of the sheet product. The coarse inclusions are mainly distributed in the lower part of an open type ingot and the upper part of a closed type ingot. They reveal an annular distribution on the horizontal cross section of the ingot. These coarse inclusions exist in all rimmed steels, but are not easily detected in medium and thick plates and shapes.

AUTHOR: MO Shuchi [5459 0647 6688]
WANG Zuoyao [3769 0155 1031]
YANG Yuanguang [7122 6678 0342, deceased]

ORG: None

TITLE: "A Study on High Speed Steel Melting Using V_2O_5 as Alloying Addition"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 3, May 80 pp 18-24

TEXT OF ENGLISH ABSTRACT: The thermodynamics and kinetics of V_2O_5 reduction in an electric furnace melting high speed steel are described. Results of experiments proved that V_2O_5 could be used as an alloying addition in the place of Fe-V, and this is of economic significance.

AUTHOR: WU Longhua [0702 7127 5478]

ORG: None

TITLE: "Theoretical Analysis and Realization of the 'Complete Asynchronous' Rolling"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 3, May 80 pp 25-30

TEXT OF ENGLISH ABSTRACT: This paper gives a theoretical analysis of "complete asynchronous" rolling from mechanical and kinematical considerations. Analytical and computational expressions for unit-pressure distribution, average unit pressure, total pressure have been derived, as well as the tension and thickness, and technological principles are described for realizing "complete asynchronous" rolling which, it is expected, could be used in setting, controlling and studying this rolling process.

From the theoretical analysis, it can be seen that "complete asynchronous" rolling is realizable, but its condition is rather strict, and that the "S" asynchronous rolling is one of the better processes. It is shown that the tension of this process possesses the ability of self regulation. The application of "S" asynchronous rolling to production is discussed.

AUTHOR: CONG Shuhe [0654 2579 0735]

ORG: None

TITLE: "Calculation of Stresses in the Quarto-Prism Mandrels for Strip Coilers"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 3, May 80 pp 31-37

TEXT OF ENGLISH ABSTRACT: Most of the formulas for the calculation of radial stress in mandrels for coilers are derived from the Lame equation, based on the assumption that the mandrel and coil are cylinders of thick walls, and that in both the elastic deformations are the same. Due to the development of strip mills, the improvement of quartoprism mandrels, and the application of automatic collapse control, these formulas have become unsuitable.

Based on the real working conditions of the mandrels (the quarto-prism mandrel not being cylindrical and the use of automatic collapse control), a formula is derived from the dependence of radial mandrel stress on the limiting pressure in the hydraulic circuit of the collapsible cylinder of the mandrel.

The formula has been compared with some experimental curves and existing

[Continuation of GANGTIE No 3, May 80 pp 31-37]

mandrels. Production practice of mandrels designed and manufactured according to the new formula has proved that the calculations are in good agreement with practice and that the formula is suitable for use in design calculations.

AUTHOR: TAO Zhicheng [7118 1807 6134]
YOU Guowang [3266 0948 2489]
YU Xianlong [0060 7359 7893]
DANG Wenlu [7825 2429 7785]

ORG: None

TITLE: "Influence of Martensite on Steels' Properties in 15CrMo and 12Cr1MoV"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 3, May 80 pp 38-47

TEXT OF ENGLISH ABSTRACT: "Yellow blocky martensite" has been found in some of the 15CrMo and 12Cr1MoV steel pipes delivered to a boiler factory for use in the manufacture of high pressure boilers. This martensite appears to be yellow under the microscope (without filters) with a high hardness, and is considered to be a martensite rich in carbon. Its formation was found to be due to improper heat treatment. The normalizing temperature had been too low (below Ac_1) and there was no tempering or the tempering temperature had been to high (above Ac_1). In either case, the steel structure was ferrite plus austenite rich in carbon. During consequent cooling the carbon-rich austenite transformed into martensite. Tests at room temperature and high temperature proved that this martensite caused an increase in room temperature strength and a

[Continuation of GANGTIE No 3, May 80 pp 38-47]

catastrophic decrease in high temperature rupture stress. Metallographic observation showed that a comparatively rapid transformation occurred in specimens that contained martensite, i.e., the structure decomposed into ferrite plus dispersed carbides after testing for several thousand hours, while in specimens with conventional structures, a considerable amount of tempered bainite remained after 10,000 hours of testing. The heat treatment of finished pipes must be controlled strictly in order to prevent martensite formation. A lower tempering temperature is suggested. The proper way to eliminate such martensite in received pipes is to perform normalizing followed by another tempering.

AUTHOR: WANG Zengtu [3769 1073 0956]

ORG: None

TITLE: "New Developments in the Magnetic Concentration of Iron Ores"

SOURCE: Beijing GANGTIE [IRON AND STEEL] in Chinese No 3, May 80 pp 75-78

TEXT OF ENGLISH ABSTRACT: In this paper, the general situation of world iron ore production in the last 25 years (1950-1974) and the total reserves of iron ore are presented. In order to increase the productivity of blast furnaces, they must be fed with high iron content burdens. Since the greater part of the iron ore reserves in our country is low grade ore, this can only be fulfilled by concentrating these ores. This paper describes the new developments in iron ore concentration by magnetic separation. Different types of magnetic separators with low and high field intensity are described in detail.

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CSO: 4009

AUTHOR: None

ORG: Third Geological Team, Shandong Provincial Bureau of Geology

TITLE: "Understandings in the Extension of Small Caliber Diamond Drills"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 7-10

ABSTRACT: The team began to operate its first small caliber diamond drill in Dec 75. Through gradual development, the team now has 7 such drills. In these 3 years, 105 holes of varying sizes have been completed, and 94 percent of these meet the geological requirements. The unit cost of the drills was 24.7 yuan in 1977 and 32.85 yuan in 1978. The average footage for natural diamond drill has been 36.31 m, 40.46 m for artificial diamond drills; that of 49 bits exceeded 100m, and the maximum for a bit was as high as 311m. The paper discusses the team's experience of gradually adopting small caliber diamond drills to replace steel granule bits for rock boring. Problems of burnt drills, sudden reduction of average footage per bit, excessive drill pressure, etc. occurred during this period of 3 years are analyzed.

AUTHOR: None

ORG: Hubei Provincial First Geological Brigade

TITLE: "A Footage of 502m Achieved for No 2990 Natural Surface Inlay Diamond Drill Bit"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 11-12

ABSTRACT: The brigade began to use diamond bits for its No 9 drill in 1976. A record single bit footage of 403.97 was created in 1977 with Wuxi natural internal inlay No 7005 drill bit; 442.63 m in 1978 with Zhengzhou natural surface inlay No 2588; 502.73m in 1979 with Zhengzhou natural surface inlay No 2990 drill bit. Members of the brigade have been seriously learning the diamond drilling technique. During the practice period since 1976, experience has been continuously summarized to improve the work procedure, to reduce the cost of drilling prospecting, and to utilize the full advantage of the small caliber diamond drill bit. The experience of achieving the record 502m footage is analyzed, specification of the drill bit No 2990, parameters of the drilling process, and conditions of the prospecting site are reported. The condition of wear of drill bits is also described.

AUTHOR: None

ORG: Prospecting Engineering Division, Shaanxi Provincial Bureau of Geology

TITLE: "Abnormal Wear of Diamond Drill Bit in Rock Core Drilling Prospecting"

SOURCE: Beijing TANKUANG GONGCHENG [PROSCPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 12-15

ABSTRACT: In the past several years, the bureau has been gradually extending the diamond drilling technique and relatively good results have been obtained, but due to reasons of poor coordination among equipment, work procedure, and technical skill, the effort in lengthening the life of the drill bit has been directly affected. A most recent analysis of a batch of used bits disclosed that the ratio of abnormal wear reached as high as 69.4 percent. This fact and the fact of the unreasonable price of these drill bits have combined into an obstruction to further development of diamond drilling. Factors affecting the life of the drill bits include the quality of the diamond, the method of making the bit, suitability of the strata, and the technique of drilling and drill operation. This paper analyzes the worn bits, classifies the conditions of abnormal wear, and describes the various markings on the worn bits for the purpose of determining correctly the reason for the abrasion or damage so as to formulate proper measures for prevention. The paper includes photos of worn bits.

AUTHOR: WANG Sili [3769 1835 4409]

ORG: Geological Team, Beijing Bureau of Construction Materials

TITLE: "Advantages of Small Caliber Drill Prospecting in Cement Rocks"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 16-17, 10

ABSTRACT: Prospecting for calcareous rocks used in cement is an important job of construction materials geology. For the purpose of improving drilling efficiency, the Construction Materials 604 team (Beijing Construction Materials Bureau Geological Team) and the 402 team (Guangdong Construction Materials Geological Prospecting Team) began to try diamond small caliber drilling in 1976 and 1977. The average footage was 140m per bit for 604 team, with a 300m maximum, and about 200 m for 402 team, with a 350m maximum. The paper compares the efficiency and quality of bits of different calibers and efficiency and cost of operation of the 2 teams, as well as the cost efficiency of various types of diamond bits.

AUTHOR: WENG Jiao [5040 2699]

ORG: None

TITLE: "Investigation Into Automobile Drill Designing (Motive Power Portion)"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 18-23

ABSTRACT: In the past, many papers confused vehicle-carried drills and automobile drills. In the former, the vehicle and the drill are separate entities; the structure of the drill is not related to an automoble while the vehicle serves the function of transporting the drill only. In the latter, the motive power of the automobile is used as the motive power of the drill, and as much as possible, its gearshift, clutch, the universal joint, the air pump, etc. of the automobile are also utilized by the drill as integral parts. Since gasoline engine is used in an automobile, the design of an automobile drill also involves studies on the characteristics, the work condition, and the work limit of gasoline engines. Problems and parameters of the internal combustion engine, as it is applied as the motive force of the drill are discussed at length in the paper.

AUTHOR: LI Dayong [2621 1129 3938]

ORG: None

TITLE: "Application and Development of Reverse Cycle Drilling Technique"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 24-26, 15

ABSTRACT: Advantages of reverse cycle drilling, compared with the normal cycle, include a low power consumption, the realization of continuous sample taking without contaminating specimens, better elimination of dust, better cooling of drill bit, higher footage efficiency, etc. The paper also briefly introduces 6 different types of reverse cycle drills.

AUTHOR: XIAO Shunzi [5135 5293 0745]

ORG: Seventh Geological Brigade, Hubei Provincial Bureau of Geology

TITLE: "On Straight Line Bucket Cutting Demolition"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 27-30

ABSTRACT: Ordinary, to add new free surfaces to a tunnel, diagonal cutting is used, but a tunnel has specifications and the hole is limited by the minimum resistance line. Furthermore, the rock hacking machine cannot make a relatively deep diagonal hole. For these reasons, the footage made by each blast is also very limited. This paper introduces the using of straight line cutting to make a bucket-shaped hole for overcoming this weakness to increase work efficiency.

AUTHOR: None

ORG: Hole Protecting Leak Plugging Team, Institute of Prospecting Work Technology Research

TITLE: "Phenylic Acid Denatured Urea Aldehyde Resin Powder"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 38-41

ABSTRACT: Application of high molecular chemical grouting is a new field of high molecular applied chemistry. Advantages of using liquid phenylic acid denatured urea aldehyde resin to protect holes and plug leaks include the easy availability of raw material, which is inexpensive, easy control of solidifying time, good mechanical property, etc. But, it also has shortcomings. It can be stored only about 6 months, packing and transportation are difficult, and to establish a machine shop to make it in every geological team would create waste of manpower. For these reasons, at the 1977 meeting of the State's Bureau of Geology, the suggestion of Anhui 311 Geological Team for making the phenylic acid denatured urea aldehyde resin into powder was welcomed by all delegates, and the job of studying the way to do it was given to the institute. The institute began the research project late 1977. Finally, with the help of Chengdu Glue Plant, the powdered resin was successfully made. This paper reports the way to make it and its major properties.

AUTHOR: CHEN Houxian [7115 0683 6343]

ORG: First Geological Team, Jiangsu Provincial Bureau of Geology

TITLE: "Reasons for Excessive Machine Oil Consumption of 295, 495 Diesel Engines"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 42-43

ABSTRACT: The merits of 295, 495 diesel engines have been widely confirmed, but their shortcoming is the fact that they consume too much machine oil. One 495 diesel machine of the first geological team had used 10.5 kg/24 hours of machine oil, the equivalent of 9.7 g/horsepower hour. This is twice as much as the highest level, 5 g/horsepower hour, permitted by Yangzhou Diesel Engine Plant. This paper reports the reasons for the high consumption and ways of reducing machine oil consumption of these diesel engines. The paper also includes a section listing items to be given attention when these diesel engines are being operated.

AUTHOR: QIAN Bingchang [6929 3521 2490]

ORG: 417 Team, Hunan Provincial Bureau of Geology

TITLE: "Drill Prospecting Work Slide Rule"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 44-45

ABSTRACT: After 2 years of research, the first batch of slide rules for calculating irregular specifications in the hole of any stage of drilling, the total weight of drill machine of different unit weights, including the weight of drill tool under flushing fluid of different specific gravity or the weight in a diagnol hole, lifting resistance, etc. have been completed. Many data used to make the slide rule were obtained during practice and through computation after having mastered the regularities in the process of practice. The workers and technicians have found the slide rule useful and convenient and the data relatively accurate. There remain many shortcomings, however. The slide rule is too big, the characters too small, and there are mistakes in the data and in the graduation. Future improvement is planned.

AUTHOR: WANG Yuechen [3769 2588 5256]

ORG: Sixth Geological Team, Yunnan Provincial Bureau of Geology

TITLE: "Analysis of Troubles of TLGI-1 Silicon Controlled Exciter Regulator"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 46-47

ABSTRACT: In recent years, silicon controlled exciter regulator is being extensively used in intermediate and small A.C. synchronous generators. It improves the quality of the power suppl and is generally welcomed. In the process of utilization, the regulator is found to be not long lasting and easily damaged, however. This shortcoming may be overcome by correct utilization and reasonable repair and maintenance. Using the TLGI-1 silicon controlled exciter regulator produced by Shanghai Switch Plant as an example, this paper introduces the common troubles and ways of analyzing the troubles in order to repair the system. Circuit theory and the work principle of this regulator are given.

AUTHOR: None

ORG: Department of Prospecting, North China Metallurgy Geological Prospecting Company

TITLE: "Stratified Drilling Experiment With Artificial Diamond and Hard Alloy Bits"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 48-49

ABSTRACT: At the production experiment site of a certain iron mining region, the strata vary a great deal between soft and hard, and diorite, metamorphic diorite, and large rock bodies appear alternately. In the relatively compact diorite, the artificial internal inlay diamond drill makes good footage and the efficiency is twice as high as that of steel granule bit, 1.5 times better than needle-shaped alloy bit, and 5.8 times better than common hard alloy bit. In the metamorphic diorite, the artificial diamond bit is still better than other bits. In the relatively soft marble, the efficiency of the diamond bit drops obviously. The footage, the average m/hour, etc. of the various bits of various calibers in different rock strata, the condition of bit damage, and other data of the experiment are reported.

AUTHOR: None

ORG: Department of Technical Safety, Gan Dongbei [Northeastern Jiangxi] Geological Brigade, Jiangxi Provincial Bureau of Geology

TITLE: "Moveable Work Platform Automatic Safety Device"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 50-51, 23

ABSTRACT: The moveable work platform is an improvement over the drill tower platform. The moveable platform has the merits of saving wood, reducing the need for transportation, lightening the work load, and convient to work on. The hanging type moveable work platform is operated with hand brakes, however. The workers are often too busy to remember to brake it sufficiently to cause the platform to rise or fall suddenly to result in serious accidents. Tragic accidents taught the Department that the moveable platform [scaffolding?] should have a safety device. One was designed in March 79. The device includes 2 parts; one for preventing it to fall and the other for preventing it to slide. The work principle of the safety device, the condition of the test use, the method of installing it onto the moveable scaffolding are reported. The method of installing the device onto the scaffolding is illustrated with a drawing.

AUTHOR: None

ORG: Seventh Geological Brigade, Liaoning Provincial Bureau of Geology

TITLE: "Method of Improving the Quality of Making Drill Rods"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 pp 52, 49

ABSTRACT: Before 1977, the brigade had a very serious problem of broken drill rods. Accidents due to broken drill rods in the hole amounted to 17.6 percent of the drilling time in 1977. Measures to improve the process of making the drill rods were adopted. In 1978, the accident time due to broken drill rods in the hole was reduced to 7 percent of the drilling time for that year, it was further reduced to 1.7 percent in 1979. Ways adopted to improve the way of making the drill rods is described.

AUTHOR: GUO Qingxin [6751 1987 2450]

ORG: Repair and Assembly Shop, Geology 9th Team, Honan Provincial Bureau of Geology

TITLE: "Improvement of the Pressure Device of DPP-100 Automobile Drill Drill Rod"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 p 53

ABSTRACT: The pressure device of the DPP-100 automobile drill drill rod was originally designed to add pressure with a hand crank for the purpose of improving the footage efficiency and lightening the work load. The author and colleagues added a worm shaft to make the hand crank much easier to operate. The added structure is depicted in a drawing.

AUTHOR: BEN Kun [6321 0981]

ORG: Third Geological Team, Hubei Provincial Bureau of Geology

TITLE: "Slight and Convenient Rock Core Specimen Splitting Machine"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 1, Feb 80 p 53

ABSTRACT: For the purpose of lightening the work load, the team designed a rock core specimen splitting machine, weighing only 17 kg. The original machine weighs 60 to 70 kg. The structure is identical to the original one, however. The new machine has been tried for 10 years. Aside from the splitting knife and the punch head, none of the other parts have ever been damaged. Now every branch team has been given a machine of the new design.

AUTHOR: MAO Wenzhang [3029 2429 4545]

ORG: None

TITLE: "Quickly Realizing Scientific Management of Geological Prospecting"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 1-3

ABSTRACT: Geological rock core drilling engineering is an important aspect of the work of searching for minerals and at present, it is the only reliable way of obtaining first hand material information. Geological observation and evaluation of mineral reserves form one of the important means of supporting geological reports. This work consumes a gigantic quantity of manpower, materials, and capital investment. The geological system operates about 2,500 drills of all types to complete 5,000,000m^3 of drilling work every year. In the past decade, the interference and destruction of the gang of four and the blind continuance of old management techniques of the USSR of the 1950's have resulted in no reform of the system of management and methods of economic and technical accounting to cause the quality of engineering to be poor, footage efficiency to be low, material consumption to be great, and accident rate to be high. In the paper, the author proposes a 7-point reform to overcome this situation. He invites the drilling workers and management leaders of all ranks to discuss his proposal.

AUTHOR: ZOU Zhihua [6760 4249 5478]

ORG: None

TITLE: "Results of Drill Sampling and Several Problems of Future Development"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 4-7

ABSTRACT: Drill sampling is the use of ultra-miniature core drilling machine to take specimens. This type of drill is small, light, and easily moved. It can be used to penetrate the ground surface cover to take samples from the shallow stratum or soil layer. This technique is currently adopted by many advanced countries of the world for general prospecting. Before the 1970's, China had followed the related principle of the USSR for using well, fellow, or shallow pit prospecting and mostly through manual digging. The work was labor intensive and very slow. It was in the late 60's that research on that type of drills began; several types, including the 502, the XB-25, the QZ-5, and the Zhengguang 10-1 have been made, but only Zhengguang 10-1 is in steady production. The technique is mainly to use drilling to replace partially the fellow-digging work. This paper reviews the results of sample drilling since 1973 and problems relating to the quantity and quality of the technique. Many current shortcomings are discussed and positive development of new methods, new equipment, and new work procedure is urged.

AUTHOR: WANG Kaiwen [3769 7030 2429]

ORG: Scientific Research Institute, Neimeng Coal Geological Prospecting Company

TITLE: "Rock Classification of Zhuozishan Region"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 8-9

ABSTRACT: In China and abroad, rock classification methods may be said to belong to one or the other types. One type is classification according to drillability based upon test data. As production and technical conditions change, this type of classification may easily be outdated. This paper introduces the method of classifying rocks according to one characteristics or several major characteristics of the rocks themselves, i.e. classifying rocks according to tested dynamic hardness and pressure resistance of the rocks. Two instruments designed and made by the Institute of Prospecting Technology Research of Ministry of Geology were used to divide the 34 representative specimens collected from the No 911 Hole of Zhuozishan Region according to their hardness and pressure resistance. The data are reported.

AUTHOR: JIANG Tianshou [3068 1131 1108]

ORG: Institute of Prospecting Technology Research, Ministry of Geology

TITLE: "Problem of Upside Down Inversion of Rock Core During Jet Type Reverse Cycle Drilling"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 9-13

ABSTRACT: Jet type reverse cycle drilling at the bottom of the hole is an effective method of improving the rate of gathering specimens of hard, brittle, and clastic rock and mineral strata. Inversion of the rock core occurs when the core is broken, or there is sufficient amount of broken core in the core pipe to produce an upside down space shift, or the reverse cycling fluid has a sufficient flow speed to cause the broken core to rise. This paper reports data of mathematical and laboratory simulations of the condition. Method to estimate and calculate the maximum amount of water back flow or maximum size in reverse cycle drilling not to cause the rise of broken core and produce an upside down inversion is proposed accordingly.

AUTHOR: YANG Xiaoxian [2799 1321 0341]

ORG: Guangxi Construction Material Industry Geological Team

TITLE: "Adoption of the Method of 4-shift 8-cycle Digging in Tunnel Mineral Prospecting to Accelerate the Footage"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 14-15

ABSTRACT: Based upon past experience, tunnel prospecting is necessary. In the past, 4m of drill prospecting and 1m of tunnel prospecting formed the adopted rule. In the process of tungsten prospecting in Jiangxi Province, the rule of 4m drilling and 2m tunneling was used. In countries such as the USSR, Japan, and Australia, the tunneling work generally amounts to 45-50 percent of the drill prospecting work. Results of tunnel prospecting are the best, but the work must be mechanized and the manpower must be organized reasonably. This paper compares the footage of 3-shift and 6-cycle organization of labor with the 4-shift 8-cycle way of organization. If the footage of each blast is 1.2m, the former will complete 7.2m per day and 187m per month, while with the latter a footage of 250m may be completed in a month. Charts are given to describe the work progress of the 4-shift 8-cycle method of organization suggested by the paper.

AUTHOR: ZHANG Hongye [1728 3163 0673]

ORG: Bureau of Hydrological Geology and Engineering Geology, Ministry of Geology

TITLE: "An Investigation of the Direction of Development of Hydrological, Well Drilling Prospecting Technology"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 16-18

ABSTRACT: In the past 30 years, a great deal of technical reform and reconstruction have occurred in China to improve the prospecting efficiency and engineering quality of hydrological, well drilling technology to contribute to the prospecting and development of ground water resources. In 1979, the geological system had 73 hydrological teams to operate about 560 drill machines and complete about 900,000m of prospecting work. At present, there is still a great distance in well drilling technology and technical equipment in China, compared with those of the advanced in the world, however. This paper reviews the current problems and needed improvements in the field.

AUTHOR: ZUO Keqian [1563 0344 6197]
HUANG Xipei [7806 5261 1014]
SHAO Junqi [6730 0193 3825]

ORG: All of Tianjin Municipal Geological Division

TITLE: "Water Filter Pipe With Pasted-on Gravel"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 19-20

ABSTRACT: The water filter pipe with pasted-on gravel is a new well filter device. Artificially synthesized resin is used to paste gravel onto the external surface of a pipe to a thickness of 10-18mm and a porosity of 23 percent. Research on this device has been preliminarily successfully completed by the division. The work procedure of using common epoxy resin, phenylic or urea aldehyde resins, or furan resin to paste gravel onto pipes made of either metal, or plastics, or glass-steel is described. Advantages of this type of filter include good quality of water, faster well drilling due to simplification of well structure, reduction of well drilling cost, and reduction of equipment wear and material consumption. Photo and drawings are included to depict the structure and appearance of this type of filter.

AUTHOR: YANG Jingbin [2799 2529 1755]

ORG: None

TITLE: "Successful Research on 3 Types of Catalysts and Their Installation Assemblies"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 p 21

ABSTRACT: A joint research project by Beijing University, Anhui Provincial 313 Geological Team, Zhejiang Jinhua Geological Brigade, Tianjin Painted Insulating Wire Plant, and Shanxi Provincial Bureau of Geology has successfully produced PLC Globular Platinum Catalyst, XLC-1001 Rare Earth Catalyst, and PPC Beehive Platinum Catalyst. All have been used on CJ-12 diesel engine vehiclesand Hongqi Internal Combustion Trucks. Catalytic converter box and smoke cleansing box have also been designed to be used with the 3 types of catalysts. After 1,000 hours of test run, the purification effects were found to be good. In the experimental tunnel, the ratio of harmful gases was found to be less than the standard set by the State. A certification conference was called by the Bureau of Science and Technology of Ministry of Geology and held in Beijing in Jan 80. The 40 plus delegates listened to the reports of the research group and observed the laboratory and the work condition of the Hongqi internal combustion truck with the catalytic converter installed. It was certified that the products meet the standard of industrial hygiene completely. Photos of these catalytic converters are included.

AUTHOR: WANG Xikai [3769 1585 0418]
WEI Ruying [7614 3067 4481]
ZHOU Xiang [0719 5046]

ORG: All of Geological Prospecting Division, Kirin Provincial Bureau of Geology

TITLE: "Merits of Diamond Drilling Considered From the Viewpoint of Economic Effects"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 41-42

ABSTRACT: Diamond drilling has the obvious merits of high efficiency, good quality, saving steel materials, and low labor intensity, but at present the diamond drill bit is rather expensive. The cost of materials per m of drilling footage is at times higher than that of steel granule bits. This fact interferes with further extension of diamond drilling prospecting. The authors went to Lianhuashan Mining District to carry out a survey to study the economic effects of diamond bits. That district contains mainly copper veins, with the average hardness of rocks from 8 to 9. Prospecting began in 1970 with steel granule drills first; in 1976, diamond drills began to be gradually adopted. The cost per m averaged 34.54 for the diamond bits and 30.12 yuan for the steel, but the cost of the diamond drilling per m had dropped from 53 yuan in 1976 to 26 yuan in July 1979. Furthermore, due to its high efficiency, if the cost of wage, worker's welfare bonus, insurance fund, repair, and transportation fees are properly added, the cost per m of the diamond bit is 5.7 percent less than that of the steel. Cost and quality data of both types of drill bits are given.

AUTHOR: None

ORG: 212 Geological Team, Shanxi Provincial Bureau of Geology

TITLE: "Effects of Using JXT-247 Gyroscope Inclinometer"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 42-45

ABSTRACT: The team works at a magnetite mining district. The drill holes are mostly 200-400m deep. Begining in Jun 1979, the JXT-247 gyroscope inclinometer produced by Beijing Geological Instrument Plant (47mm external diameter) has been adopted to determine the gradient of the hole. By the end of 1979, the instrument had been used to measure 17 holes, a total of 4,806m. The holes in the district are all diagonal holes, and the gradient is measured every 50 m of drilling footage; if the stratum is soft and the vertex angle of the design is relatively small, measurements are taken even more frequently. This test application proved the instrument to be a relatively ideal inclinometer in today's small caliber drilling work. Three proposals of improvement are also included.

AUTHOR: SHEN Guichen [3088 2710 1820]

ORG: Henan Provincial Geology Ninth Team

TITLE: "Technical Measures for Preventing Sleeve Pipe Accidents and Resolving the Difficulty of Lifting to Withdraw"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 46-48

ABSTRACT: The technique of leaving a sleeve pipe to protect the hole is well-known, but after the sleeve pipe is in place, accidents of breaking, slipping, and shifting often occur to cause the sleeve pipe to be difficult to remove. In some cases, the hole may have to be abandoned. With this worrying problem, some workers prefer not to place a sleeve pipe whenever the drill hole appears to be complex. Consequently, a large quantity of manpower and materials are consumed to treat the hole with other methods. From lessons learned in the past several years, the Xuchang Iron Ore District of Henan adopted 5 technical measures during the process of installing a sleeve pipe and several ways of lifting the pipe to remove it. These measures and ways are described. A table listing the conditions of installing and removing the sleeve pipes since these techniques were adopted in 1975 is included.

AUTHOR: CHEN Houxian [7115 0683 6343]

ORG: First Geological Team, Jiangsu Provincial Bureau of Geology

TITLE: "Breakage At the Latch Position of the External Wire of the Drill Rod and The Reform of the Structure of the Wire Latch"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 48-49

ABSTRACT: A broken drill rod can cause a great deal of problem and if the strata are complex, the danger is even greater. The rod may break in the middle while inside the drill hole or the head of the wire latch may break. The reason for the occurrence of the latter is mainly an unreasonable structure of the wire latch. This paper analyzes the defect in the original structure of the wire latch of the drill rod and introduces methods of reconstructing it. Merits of the reconstructed part are discussed. The team adopted this type of reasonable wire latch 6 years ago, and the various phenomena of breakage of the wire latch position have been eliminated. Similar satisfactory results have also been obtained after the Jiangsu Bureau of Geology extended this reform to all its teams.

AUTHOR: MA Qianyuan [7456 1987 6678]

ORG: 325 Team, Anhui Provincial Bureau of Geology

TITLE: "Method of Coring in Loose and Soft Stratum"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 p 50

ABSTRACT: The mining district where the team works has complicated strata, which may be basically divided into 3 types: relatively whole strata, loose and soft strata, and broken strata, in ratios of 20, 20, and 60 percent respectively. Problems of coring in the latter 2 types have not be resolved satisfactorily for a long time. The loose and soft strata, containing mostly chlorite, phlogopite, marl, and powdery iron ore, are mostly in the vicinity of the ore deposit. In this type of strata, flushing and drilling are both difficult. This paper describes a double-barrel drilling tool designed by the author and colleagues for the special purpose of taking core samples in the loose and soft strata. The structure of the drill tool is described and illustrated.

AUTHOR: None

ORG: Ore Prospecting Department, Third Geological Team, Gansu Provincial Bureau of Geology

TITLE: "Method of Bridging a Drill Hole Introduced"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 50, 52

ABSTRACT: In the drilling process, additional core specimens may be needed, the flushing water may be leaking and the leak may be relatively high from the bottom of the drill hole, the curvature of the hole may not meet the design requirements, or a particular layer may have to be enclosed, and so forth, to cause it necessary to build a "bridge" in the hole. Many teams have experimented several ways of using steel wire, spring plug, bamboo splint, etc. to make the bridge, but the building may take a long time and the bridge may not be reliable. This paper introduces the method of using 2 pieces of wedge-shaped wood blocks with a rubber sheet 5mm in thickness in the middle that is slightly larger than the hole. A wire is fastened onto the wood blocks to enable it to be dropped slowly by the drill. When the bridge is at the desired location, a few pieces of stone or gravel are thrown in to immobilize the wood block before the wire is broken to lift the drill. Drawings are given to help explain the bridge building procedure.

AUTHOR: None

ORG.: Ninth Geological Brigade, Liaoning Provincial Bureau of Geology

TITLE: "Parallel Dual-Nozzle Hole Bottom Spraying Type Reverse Cycle Drill Tool"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 3, Jun 80 pp 51-52

ABSTRACT: When the strata are sometimes whole and sometimes broken, the method of repeated positive and reverse cycle drilling is often adopted. When the drill is turned from positive to reverse, if there are residual core, drill dust, grains of steel etc. in the hole, the resistance may be great, and the drill rotation may be slowed to cause burned drill in the hole. This sort of occurrence can cause the footage efficiency to drop suddenly. For the purpose of resolving this problem, a parallel dual-nozzle hole-bottom spraying reverse cycle drill tool was designed by the team. It has been used in 3 mining districts and completed more than 1,800m of drilling footage. The results are much better than the single nozzle reverse drilling tool. The properties of the drill tool is described and items to be given attention when the tool is used are explained. There is a drawing depicting the structure of the dual-nozzle drill tool.

AUTHOR: NIU Xingping [6873 1748 1627]

ORG: None

TITLE: "Urgently Promote the Development of Small Caliber Drill Prospecting Work"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 pp 1-4

ABSTRACT: This paper is an excerpt of a speech delivered by the author at the small caliber drill prospecting work symposium in the Ministry of Geology which was held in Jishou of Hunan Province. Hunan Bureau of Geology began in 1979 to acquire 29 small caliber drills to produce an efficiency of 61.8m per drill at a unit cost of 34.75 yuan, i.e. 2.17 yuan less than that of large caliber drills. Now, aside from the 405 team, the 402 team also adopts small caliber drills. The subject of conversion to small caliber drills is one of the 5 key technologies being promoted by the Ministry of Geology. The author hopes that by 1985, small caliberization will be realized by all teams. In the paper, he discusses mainly the current condition of small caliber drill prospecting work and the problem of its future development.

AUTHOR: LI Shijing [2621 0013 0079]
ZHANG Zurong [1728 4371 2837]
XU Xiaojun [1776 2556 6511]

ORG: None

TITLE: "Several Suggestions for Accelerating the Development of Diamond Drill Prospecting"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 pp 4-6

ABSTRACT: Diamond drill tools have the merits of having good quality, high efficiency, few accidents, and less wear. This is the technique adopted for solid ore prospecting in foreign countries, and its superiority has also been proved in domestic applications, especially in regions of low core sample collection rate and serious problem of slanted holes. At present, about 23 percent of the core drill prospecting work of the geological system is done with small caliber drills, still a long way from the target of realizing small caliberization in 10 years. The authors propse a basic reform of the cost accounting method to include wage, workers welfare fund, materials, labor protection fund, outside wages, repair fee, transportation fee, management fee, etc., special assignment of liquid capital assets, improving coordinated equipment assembly, and the adoption of a system of awards and penalties to accelerate the development of small caliber drills.

AUTHOR: HU Zhiman [5170 1807 2809]

ORG: None

TITLE: "Reasons and Regularity of Curvature of Drill Holes and an Investigation Into the Method of Its Prevention"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 pp 6-11

ABSTRACT: It is generally believed that the reason for the appearance of slanted hole is the joint action of the geological factor and the work technique factor. The author believes that the 2 factors must be analyzed separately, while the factor of the drilling design must also be added. In the second chapter of the paper, the principle of curvature of drill holes is discussed at length. The third chapter of the paper is devoted entirely to methods of preventing hole curvature. If the rotation speed of a small caliber drill is not greater than 600-700 turns/minute, and the drill pressure of the diamond bit is reduced 1/5 - 1/3 of normal for strata that will produce slanted holes easily, the result can be much better.

AUTHOR: YAN Shi [6056 1395]

ORG: None

TITLE: "A Selection of Scientific and Technical Achievements in Prospecting Engineering in 1979"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 pp 21-24, 15

ABSTRACT: The paper lists the following accomplishments in prospecting engineering in the year 1979: (1) Diamond drilling: Accomplishments of 14 geological teams, Guangdong 705, Kirin 10, Hunan 408, Jiangxi 916, etc. are reported. (2) Hole protection,leak plugging:Use of synthetic resins, cement, denatured cyano-glue etc. to plug leaks successfully by 11 teams is reported. (3) Measurement of hole curvature, its precention and control: Work of 7 teams is described. (4) Hole bottom motor: Attainments of 8 teams are given. (5) Geothermal well drilling: Work in Xizang is reported. (6) Drill machine, slurry pump, and meters: Products of 19 teams are described. (7) Tunrel prospecting engineering: Work of 5 sites is described. (8) Other: Accomplishments in other subjects by 9 teams are reported.

AUTHOR: XU Guangxin [1776 0342 9515]

CSO: None

TITLE: "Concerning Breakage of Small Caliber Drill Rods and Measures of Prevention"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 pp 46-47

ABSTRACT: Breakage of new drill rods and drill rods before reaching their life span is an abnormal phenomenon, which had continuously occurred in the team to which the author is affiliated. Preliminary satistics revealed 231 such accidents in the team from Jan to Oct 79, to lose 1661 machine-hours, amounting to one machine not being used for 2.3 months. This paper describes the circumstances of these accidents, the reasons learned from analyses of these accidents, and measures adopted to prevent them. These measures are reported to be effective but the paper fails to relate the breakage situation after these measures were adopted.

AUTHOR: LU Fan [7627 0416]
ZENG Renxie [2582 0088 0204]

ORG: None

TITLE: "Application of Sodium Capric Fat Soap in Drilling With Synthetic Diamond"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 pp 48-49

ABSTRACT: Sodium capric fat soap [detergent] is a good negative ion type lubricant, made from a waste residu of making decanedicic acid. The authors first experimented with it at several prospecting teams in Anhui and Hunan, with the support of 311 Brigade of Central South Bureau of Prospecting, which had began to use it as a lubricant in Jul 79 in 5875m of drilling work to the satisfaction of workers and technicians. Decanedioic acid is the raw material for nylon, which is in rapid development in China; therefore, this lubricant may be made very inexpensively. The tests found the lubricant to be satisfactory, except for the fact that it cannot be used for drilling in strata of crystalline limestone and marble.

AUTHOR: WANG Jisheng [3769 0679 3932]

ORG: None

TITLE: "Blast Method of Treating Accidents in the Hole"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 pp 49-50

ABSTRACT: In KANTAN JISHU [PROSPECTING TECHNOLOGY] No 3, 76, the Third Branch Team of the 723 Geological Team of Guangdong Provincial Bureau of Geology reported in a paper the use of in-hole blasting to take care of drill accidents. In Jun 76, the team to which the author is affiliated adopted the method and designed a blasting device for use of that purpose. Since then, the device has been used to treat accidents of fire in holes 100m-820m deep, jammed electric cable, detached hammer, and buried drill, etc. more than 70 times to achieve a success rate of more than 95 percent. The structure of the blasting device, the method of using it, and items to watch for while using it are explained.

AUTHOR: ZHAO Like [6392 4539 0344]

ORG: Chengdu Repair Plant, Sichuan Provincial Bureau of Geology

TITLE: "Reconstructing Old Fashioned Slotting Latheto Finish Rock Core Driving Spring"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 pp 51-52

ABSTRACT: The provincial bureau of geology assigned the team the job of producing a batch of rock core driving springs used with small caliber drills. The grooves of the springs do not fit the drawing machine. The punch machine was tried but the corners of the mold became dull too easily and the surface of the product was not satisfactorily smooth. Finally, a set of hycraulic pressure semi-automatic device was specially designed, with a sinuated blade added to reconstruct an old fashioned slotting lathe for this purpose. With this tool, each spring can be made in 2 plus minutes. The product and the reconstructed tool are described with numerous drawings.

AUTHOR: LOU Enqi [2869 1869 0366]

ORG: Mineral Prospecting Division, Hubei Provincial Bureau of Geology

TITLE: "Fall Preventive Device for the Moveable Work Platform of EDY Drill"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 p 52

ABSTRACT: The moveable work platform is the lift carrying the workers up and down on the drill tower [derrick]. Since it was adopted in the place of a ladder, the work condition improved and labor productivity has been raised also, but a new problem has arisen. Under the condition of careless inspection, improper work procedure, etc.the platform falls or runs away easily to cause fatal accidents. This paper describes a device designed to be attached to the platform to prevent it from sliding down. In actual work condition, however, not a few accidents are caused by runaway platform. This device will not be sufficient to prevent those.

AUTHOR: HUA Daosheng [5478 1129 3932]

ORG: None

TITLE: "Several Problems in Preventing Burnt Cylinder Gasket of Diesel Engines"

SOURCE: Beijing TANKUANG GONGCHENG [PROSPECTING ENGINEERING] in Chinese No 4, Aug 80 pp 53-54

ABSTRACT: The function of the cylinder gasket of a diesel engine is to maintain prolonged and reliable sealing. It must keep the high temperature and high pressure gas tightly sealed in the cylinder yet allow the cooling water and machine oil of a given pressure and flow speed to penetrate through, and at the same time must be able to resist the corroding action of water, gas, and oil. Due to improper use, installation, and repair, the trouble of burnt gasket often occurs. The reasons for burnt cylinder gasket include the quality of the gasket, improper method of removing and replacing the gasket, deformation of the gasket, insufficient protrusion of the gasket above the cylinder plane. This paper discusses these factors separately, and provides respective measures for preventing their occurrence.

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